PATENT ABSTRACTS OF JAPAN

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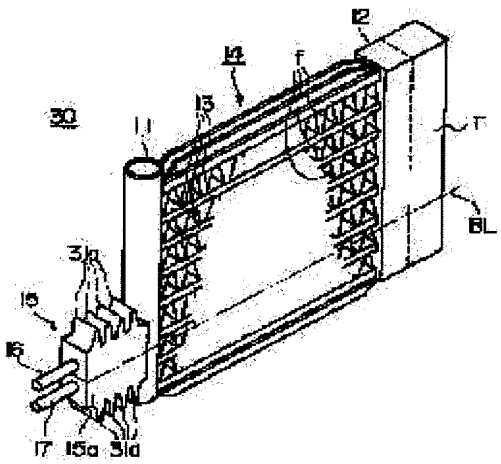
(54) PIPE COUPLING WITH COOLING FUNCTION

(57)Abstract:
PROBLEM TO BE SOLVED: To prevent a thermal influence from having on a middle temperature of a low temperature fluid by heat from a piping through which high tempera ture fluid flows by a method wherein a radiation member is provided at a body block to couple together a piping through which high temperature fluid flows and a piping through which middle temperature or low temperature fluid flows.
SOLUTION: A radiation member to radiate the heat of high temeprature fluid on the inlet pipe 16 side to the outside is provided at a body block 15a to couple together an inlet pipe 16 through which high temperature fluid flows and an outlet pipe 17 through which middle temperature or low temperature fluid flows. The radiation member has a radiation function to rapidly radiate heat, transmitted from the inlet pipe 16 to the body block 15a, to the outside like a corrugated radiation fin 31a formed in a manner to integrally protruded from the body block 15a formed of an aluminum alloy. Since the heat of the piping 16 through which high temperature fluid flows is radiated from the radiation member 31a of the body block 15a to the outside, the heat exercises no heat influence on middle temperature or low temperature fluid, and the middle temperature or the low temperature fluid flows in a desired flow state.



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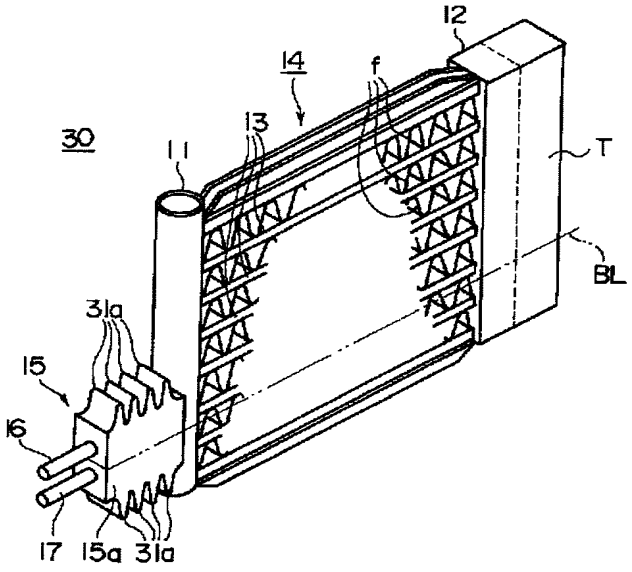
(54)【発明の名称】　冷却機能付配管継手

(57)【要約】

【課題】　高温の流体が流れる配管１６からの熱が中低温の流体が流れる配管１７に熱影響を及ぼさないようにした「冷却機能付配管継手」１５を提供することを目的とする。

【解決手段】　高温の流体が流通する配管１６と中温あるいは低温の流体が流通する配管１７が連結された本体ブロック１５ａに放熱部材３１を設けたことを特徴とする冷却機能付配管継手１５。



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【特許請求の範囲】

【請求項１】　高温の流体が流通する配管(16)と中温あるいは低温の流体が流通する配管(17)が連結された本体ブロック(15a) に放熱部材(31)を設けたことを特徴とする冷却機能付配管継手。

【請求項２】　前記本体ブロック(15a) は、熱交換器(30)のヘッダパイプ(11,12) にロー付けにより取付けられたことを特徴とする請求項１に記載の冷却機能付配管継手。

【請求項３】　前記放熱部材(31)は、前記高温流体の熱を外部に放出するように前記本体ブロック(15a) より一体的に突出された放熱フィン(31a) により構成したことを特徴とする請求項１又は２に記載の冷却機能付配管継手。

【請求項４】　前記放熱部材(31)は、前記高温流体の熱が中低温の流体側に伝達されないように前記本体ブロック(15a) の前記入口管(16)と出口管(17)との間にスリット(S) を形成したことを特徴とする請求項１又は２に記載の冷却機能付配管継手。

【請求項５】　前記熱交換器(30)は、一対のヘッダパイプ(11,12) 相互を多数の扁平管(13)により連通し、各扁平管(13)の間に伝熱フィン(f) が介装したコア部(14)を有し、前記ヘッダパイプ(11,12) 内に仕切板(18)を設けることにより入口管(16)から流入した冷媒が前記コア部(14)内を蛇行しつつ流下するように構成した多パス式マルチフロータイプのコンデンサであって、前記入口管(16)から流入した冷媒を凝縮する凝縮部(C) と、当該凝縮された冷媒をさらに冷却する過冷却部(SC)とを有し、当該過冷却部(SC)により過冷却された冷媒を流出する前記出口管(17)と前記入口管(16)とを前記本体ブロック(15a) に並列的に近接して連結したことを特徴とする請求項２に記載の冷却機能付配管継手。

【請求項６】　前記熱交換器(30)は、前記ヘッダパイプ(11,12) のいずれか一方若しくは両方に液化した前記冷媒が貯溜されるタンク部(T) を設け、当該タンク部(T) 内の液冷媒が前記過冷却部(SC)より出口管(17)を通って流出するようにしたことを特徴とする請求項５に記載の冷却機能付配管継手。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、例えば、自動車用空気調和装置の冷媒配管を接続するための配管継手、特に、内部を流れる流体の熱を放熱し得る冷却機能付配管継手に関する。

【０００２】

【従来の技術】最近の自動車用空気調和装置に対しては、熱交換性能が高くかつ省スペースであることという要請が強いことから、ここに組み込まれるコンデンサも、高性能化、小形化されている。

【０００３】一般的な周知の冷房サイクルでは、図５に

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示すように、コンプレッサ１から吐出された高温高圧の気化冷媒が、コンデンサ２で凝縮され、この液冷媒は一部がリキッドタンク３に貯溜され、残りが膨脹弁４を介してエバポレータ５に導かれ、ここで空気と熱交換を行ない、冷却された空気を、例えば車室内に吹出すという構成となっている。

【０００４】最近の自動車用空気調和装置は、リキッドタンク３をコンデンサ２に組み込むことにより装置全体の小形化を図り、またこのコンデンサ自体を、いわゆる多パス式マルチフロータイプのコンデンサとし、高性能化を図っている。

【０００５】ここに、多パス式マルチフロータイプのコンデンサ２とは、図６に示すように、平行に対設された一対のヘッダパイプ１１，１２と連通するように、多数の扁平管１３を設け、これら扁平管１３相互間に伝熱フィンｆを固着してコア部１４を形成し、一方のヘッダパイプ１１に取付けられた配管継手１５には入口管１６と出口管１７を接続したものであり、この入口管１６から流入した冷媒がコア部１４を蛇行して流れて出口管１７より流出するように、前記ヘッダパイプ１１，１２内には仕切板１８が設けられている。

【０００６】つまり、このコンデンサ２は、１群の扁平管１３内を流れる冷媒流が一方のヘッダパイプ１１から他方のヘッダパイプ１２に向かって流れる経路（以下パスと称す）が多数形成された、いわゆる多パス式のマルチフロータイプで、多量の冷媒を複数の扁平管１３により一括して流すと共にこれをコア１４内で蛇行させて流す多パス式であるので、小型であっても熱交換性能の高く高性能であり、しかもリキッドタンクの機能も合わせ持つ小型のものとなっている。

【０００７】

【発明が解決しようとする課題】ところが、このコンデンサ２では、過冷却された中温の液冷媒が流れる下部の過冷却部ＳＣと、高温のガス冷媒が流れる凝縮部Ｃとの境界面ＢＬ（図中２点鎖線で示す）で熱伝達が起こり、過冷却部ＳＣで冷却された冷媒が再加熱され、サブクール（過冷却）が取れなくなる虞れがある。例えば、冷媒封入量が適正に近いかやや少ない場合には、コンデンサ２の出口部分で冷媒は液化するのみで、サブクールを十分とることができず、ここでさらに熱伝達が起こると、冷媒はガス化するという不安定な状態になる。なお、「サブクール」とは、図７のモリエル線図において、凝縮線ａが飽和曲線ｂを越え、断熱膨張線ｃと交差するまでの部分ＳＣをいう。

【０００８】このような不安定な状態になると、膨脹弁４に流入する冷媒は、液状態とガス状態とを交互に繰返す、いわゆるハンチング状態となり、エバポレータ５の冷却性能も低くなり、車室内に吹出される空気の温度も変動する虞れがある。

【０００９】特に、最近では、地球環境保護の観点から

使用冷媒量の小量化という要請があるが、このために、使用冷媒量を低減すると、前述した高性能コンデンサ２を用いて少量の冷媒を流すと、僅かな熱負荷の変動に対してもコンデンサ２内の冷媒状態は変動し、前記不具合がさらに助長されることになる。

【００１０】本発明は、このような課題に鑑みてなされたもので、高温の流体が流れる配管からの熱が中低温の流体に熱影響を及ぼさないようにした冷却機能付配管継手を提供することを目的とする。

【００１１】

【課題を解決するための手段】上記目的を達成するために、請求項１にかかる発明は、高温の流体が流通する配管と中温あるいは低温の流体が流通する配管が連結された本体ブロックに放熱部材を設けたことを特徴とする。

【００１２】このようにようにすれば、高温流体が流通する配管の熱が本体ブロックの放熱部材により外部に放熱されるので、中低温の流体に熱影響を及ぼさず、所望の流体状態で中低温側の流体を流すことができる。特に、配管継手は、配管の出入口部分に設けられるので、両配管を近接配置しても両流体相互の熱影響を防止でき、これによりスペース的にも有利になる。

【００１３】請求項２にかかる発明は、前記本体ブロックを、熱交換器のヘッダパイプにロー付けにより取付けるようにしたことを特徴とする。

【００１４】このようにすれば、熱交換器のヘッダパイプに本体ブロックをロー付け接合する場合の熱が放熱部材により本体ブロック内部に取り込みやすくなり、本体ブロックが速やかに温度上昇し、ロー付け性を向上させ、生産性も向上する。

【００１５】請求項３にかかる発明は、前記放熱部材を、前記高温流体の熱を外部に放出するように前記本体ブロックより一体的に突出された放熱フィンにより構成したことを特徴とする。

【００１６】このようにすれば、熱交換器のヘッダパイプに本体ブロックをロー付け接合する場合のロー付け性、生産性の向上に加え、当該熱交換器使用時に本体ブロックからの放熱性能も優れたものとなる。

【００１７】請求項４にかかる発明は、前記放熱部材を、前記高温流体の熱が中低温の流体側に伝達されないように前記本体ブロックの前記入口管と出口管との間にスリットを形成したことを特徴とする。

【００１８】このようにすれば、熱交換器のヘッダパイプに本体ブロックをロー付け接合する場合のロー付け性、生産性の向上に加え、高温流体側の熱が中低温流体側に影響させないようにすることができる。また、これにより放熱部材の成形も簡単になる。

【００１９】請求項５にかかる発明は、前記本体ブロックが取付けられる相手である前記熱交換器が、一対のヘッダパイプ相互を多数の扁平管により連通し、各扁平管の間に伝熱フィンが介装したコア部を有し、前記ヘッダパイプ内に仕切板を設けることにより入口管から流入した冷媒が前記コア部内を蛇行しつつ流下するように構成した多パス式マルチフロータイプのコンデンサであって、前記入口管から流入した冷媒を凝縮する凝縮部と、当該凝縮された冷媒をさらに冷却する過冷却部とを有し、当該過冷却部により過冷却された冷媒を流出する前記出口管と前記入口管とを前記本体ブロックに並列的に近接して連結したことを特徴とする。

【００２０】このようにすれば、高温のガス冷媒が流入するときに、当該高温冷媒を１次冷却でき、コンデンサの凝縮性能をより高めることができる。また、コンデンサで過冷却された中温の液冷媒が流れる過冷却部と、高温のガス冷媒が流れる凝縮部との間で熱伝達が起き、冷媒の温度や圧力が上昇しサブクールが減少したとしても、出口部分で冷媒は再度過冷却されるので、サブクールの低下を防止でき、冷媒がガス化し冷房サイクルの状態がハンチングするような不安定になるのを防止し、エバポレータの冷却性能低下、車室内への吹出し空気温度の変動も防止することができる。

【００２１】請求項６にかかる発明は、前記本体ブロックが取付けられる相手である前記熱交換器が、前記ヘッダパイプのいずれか一方若しくは両方に液化した前記冷媒が貯溜されるタンク部を有し、当該タンク部内の液冷媒が前記過冷却部より出口管を通って流出するようにしたことを特徴とする。

【００２２】このようにすれば、別途リキッドタンクを設ける場合に比し、スペース的に有利となり、また、過剰冷媒封入時でもこれを吸収し、常に安定した冷媒をエバポレータに導くことができ、エバポレータの性能低下等を防止できる。

【００２３】

【発明の実施の形態】以下、本発明の実施の形態を図面に基づいて説明する。図１は本発明の実施の形態に係る冷却機能付配管継手を多パス式マルチフロータイプのコンデンサのヘッダパイプ分に取付けた状態を示す概略斜視図、図２は同コンデンサの概略断面図、図３は同コンデンサの概念図、図４は本発明の他の実施の形態に係る冷却機能付配管継手の斜視図であり、以下の説明に当たり、図５～７に示す部材と同一部材には同一符号を使用し、説明を一部省略することもある。

【００２４】図１に示すコンデンサ３０は、小型高性能のコンデンサで、いわゆる多パス式のマルチフロータイプであり、アルミニウムあるいはアルミニウム合金（以下アルミニウム合金等と称す）からなる一対のヘッダパイプ１１，１２相互を、同アルミニウム合金等からなる多数の扁平管１３により連通し、各扁平管１３の間に同アルミニウム合金プレート等からなる伝熱フィンｆが介装されたコア部１４を有している。

【００２５】このコア部１４は、図２に示すように、ヘッダパイプ１１と１２内に仕切板１８が設けられ、入口

管１６からヘッダパイプ１１に流入した冷媒が複数本の扁平管１３内を通ってヘッダパイプ１２内に入り、Uターンした後にヘッダパイプ１１に戻り、再度Uターンしてヘッダパイプ１２内に入るように構成された凝縮部Ｃと、凝縮された液冷媒の一部が貯溜されるタンク部Ｔと、液冷媒がさらに冷却される過冷却部ＳＣとを有している。つまり、このコンデンサ３０は、概念的に示すと、図３に示すように凝縮部Ｃと、タンク部Ｔと、過冷却部ＳＣが直列に設けられた状態となっている。

【００２６】そして、この過冷却部ＳＣにより過冷却された冷媒が流出する出口管１７と前記入口管１６とは、前記ヘッダパイプ１１にロー付けにより固着された配管継手１５に並列的に近接して連結されている。この配管継手１５は、アルミニウム合金等からなる本体ブロック１５ａに通孔を開設し、この通孔に前記入口管１６と出口管１７の端部を挿入し、ロー付けにより固着している。

【００２７】特に、本実施の形態では、このように高温の流体が流通する入口管１６と、中温あるいは低温の流体が流通する出口管１７が連結された本体ブロック１５ａに入口管１６側の高温流体の熱を外部に放出する放熱部材３１を設けている。

【００２８】図１に示す放熱部材３１は、アルミニウム合金等からなる本体ブロック１５ａより一体的に突出するように形成された波形状の放熱フィン３１ａにより構成されているが、入口管１６から本体ブロック１５ａに伝達された熱を速やかに外部に放出する放熱機能を有するものであればどのようなものであっても良く、例えば、図４Ａに示すように凹凸が繰り返された平行プレートフィン３１ｂにルーバを切起したもの、図４Ｂに示すように本体ブロック１５ａの全周に薄肉プレート３１ｃを固着することにより形成したもの、図４Ｃに示すように当該薄肉プレート３１ｃに通孔Ｏを開設し、軽量化したもの、図４Ｄに示すように本体ブロック１５ａに連結された入口管１６と出口管１７との間に熱伝達を防止するスリットＳを形成したもの等が好適に使用される。なお、このスリットＳを形成した本体ブロック１５ａに前記凹凸が繰り返された平行プレートフィン３１ｂや薄肉プレート３１ｃを取付けても良い。また、前述した本体ブロック１５ａに薄肉プレートを波形状に形成した、いわゆるコルゲートフィン（図示せず）を固着しても良い。

【００２９】また、前記コンデンサ３０には、ヘッダパイプ１２に液化した冷媒が貯溜されるタンク部Ｔが設けられている。このようにすれば、別途リキッドタンクを設ける場合に比し、スペース的に有利となり、また、過剰冷媒封入時でもこれを吸収し、常に安定した冷媒をエバポレータ５に導くことができ、エバポレータ５の性能低下等を防止できる。なお、タンク部Ｔが取付けられているヘッダパイプは、ヘッダパイプ１１又は１２のいずれでも良く、また両方に設けても良い。

【００３０】次に、上記実施の形態の作用を説明する。まず、コンデンサ３０を製造する場合には、炉中ロー付けにより全体を一体に成形する。つまり、両ヘッダパイプ１１，１２間に多数の扁平管１３を設け、各扁平管１３の間に伝熱フィンｆを介装し、さらに、ヘッダパイプ１１に本体ブロック１５ａ及び出入口管１６，１７を、他方のヘッダパイプ１２にタンク部Ｔを取付けた状態で炉内に入れ、加熱し全体を一体的にロー付けする。

【００３１】この場合、本体ブロック１５ａにも熱が加わり、ヘッダパイプ１１，１２、扁平管１３、フィンｆに比べてブロック１５は熱容量が大きいため、温度上昇が遅くなり、温度分布が異なり易いが、この本体ブロック１５ａには、放熱部材３１が設けられているので、外部からの熱がこの放熱部材３１を介して内部に伝達され、本体ブロック１５ａの温度上昇を促進させ、他の部分の温度上昇と同じになりロー付け性を良くし、生産性も向上する。

【００３２】そして、このようにして成形されたコンデンサ３０を用いて通常の冷房運転を行うと、コンプレッサ１から吐出された高温高圧の気化冷媒は、コンデンサ３０の入口管１６よりヘッダパイプ１１に入り、凝縮部Ｃを構成する複数の扁平管１３内を流れ、ここで凝縮されつつ流下し、液冷媒となる。この場合、高温のガス冷媒が流入するときに、当該高温冷媒は、本体ブロック１５ａの放熱部材３１により１次冷却されることになるので、コンデンサ３０の凝縮性能はより高められる。

【００３３】この液冷媒は、タンク部Ｔに一部が貯溜された状態で、コンデンサ３０の下部域の過冷却部ＳＣを流通するとき、外部の冷却空気と熱交換して、さらに冷却されサブクールがとられる。通常の自動車用空気調和装置の場合には、サブクールは５～８度程度である。サブクールがとられた液冷媒は、ヘッダパイプ１１内に戻り出口管１７より膨張弁４に導かれる。

【００３４】ところが、入口管１６内を流通する冷媒は高温であり、出口管１７より流出する冷媒はサブクールがとられた中低温の冷媒であるために、入口管１６の高温冷媒の熱が本体ブロック１５ａを介して出口管１７の中低温の冷媒に伝達され、冷媒の温度や圧力が上昇しサブクールが減少することになる。

【００３５】しかし、この本体ブロック１５ａには、放熱部材３１が設けられているので、外部を流れている空気流により本体ブロック１５ａは冷却され、出口部分で冷媒は再度過冷却されることになるので、冷媒はサブクールの低下が防止される。

【００３６】例えば、冷媒封入量が適正に近いかやや少ない場合には、通常のコンデンサ３０では、出口部分で冷媒は液化するが、十分サブクールをとることができないことがあるが、このような場合でも本実施の形態のコンデンサ３０は、冷媒出口の本体ブロック１５ａで、さ

らに冷媒を冷却することになるので、ここで再び冷媒がガス化し、これが下流の膨張弁、エバポレータに流れて冷房サイクルが不安定な状態になるのを防止できる。

【００３７】その後、コンプレッサの回転数の上昇にともない循環冷媒量も増大すると、コンデンサ３０内に生じる液冷媒の量も増大し、液冷媒がタンク部Ｔ内に蓄えられ、サブクール量もコンプレッサの回転数如何に拘らず一定となり、膨脹弁４には所定のサブクールがとられた液冷媒を安定的に供給される。

【００３８】したがって、出口管１７が受熱や多少の圧損を受けても、冷媒はハンチング状態とならず、エバポレータ５の冷却性能も向上し、サイクルの安定性、冷力確保の面からも好ましい状態となる。

【００３９】本発明は、上述した実施の形態のみに限定されるものではなく、特許請求の範囲内において種々改変することができる。例えば、前記実施の形態は、コンデンサ３０について説明したが、本発明は、コンデンサのみに限定されるものではなく、高温流体と中低温流体が流れる配管が連結される熱交換器に取付けられるものであれば、どのようなものでも良く、エバポレータ等にも使用することができるものである。

【００４０】

【発明の効果】以上述べたように請求項１に記載の発明は、高温流体が流通する配管の熱が本体ブロックの放熱部材により外部に放熱されるので、中低温の流体に熱影響を及ぼさず、所望の流体状態で中低温側の流体を流すことができる。特に、配管継手は、配管の出入口部分に設けられるので、両配管を近接配置しても両流体相互の熱影響を防止できる。また、これによりスペース的にも有利になる。

【００４１】請求項２にかかる発明は、熱交換器のヘッダパイプに本体ブロックをロー付け接合する場合の熱が放熱部材から多量に吸熱され、ブロックが早急に温度上昇し、ロー付け温度になるため、ロー付け性を向上させ、生産性も向上する。

【００４２】請求項３にかかる発明は、放熱部材を本体ブロックより一体的に突出した放熱フィンにより構成したので、熱交換器のヘッダパイプに本体ブロックをロー付け接合する場合のロー付け性、生産性の向上に加え、当該熱交換器使用時に本体ブロックからの放熱性能も優れたものとなる。

【００４３】請求項４にかかる発明は、熱交換器のヘッダパイプに本体ブロックをロー付け接合する場合のロー付け性、生産性の向上に加え、高温流体の熱が中低温流体に影響せず、また放熱部材の成形も簡単になる。

【００４４】請求項５にかかる発明は、多パス式マルチフロータイプのコンデンサのヘッダパイプに、並列的に近接して連結された出入口管を有する本体ブロックをロー付け固着するようにしたので、高温のガス冷媒が流入するときに、当該高温冷媒を１次冷却でき、コンデンサの凝縮性能をより高めることができ、また、コンデンサで過冷却された中温の液冷媒が流れる過冷却部と、高温のガス冷媒が流れる凝縮部との間で熱伝達が起き、冷媒の温度や圧力が再び上昇しサブクールが減少したとしても、出口部分で冷媒は再度過冷却されるので、冷媒の状態は元に戻され、サブクールの低下を防止でき、冷媒が再度ガス化し冷房サイクルが不安定になるのを防止し、エバポレータの冷却性能低下、車室内等への吹出し空気温度の変動も防止することができる。

【００４５】請求項６にかかる発明は、ヘッダパイプにタンク部を設けたので、別途リキッドタンク部を設ける場合に比し、スペース的に有利となり、また、過剰冷媒封入時でもこれを吸収し、常に安定した冷媒をエバポレータに導くことができ、エバポレータの性能低下等を防止できる。

【図面の簡単な説明】

【図１】　本発明の実施の形態を示す概略斜視図である。

【図２】　同実施の形態の概略断面図である。

【図３】　同実施の形態の概念図である。

【図４】　本発明の他の実施の形態を示す斜視図である。

【図５】　一般的な冷房サイクルを示す説明図である。

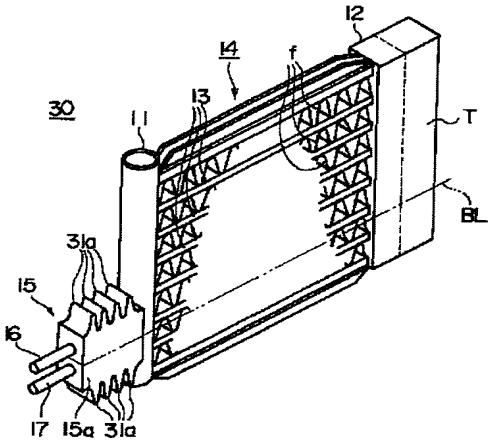
【図６】　従来のコンデンサの断面図である。

【図７】　一般的なモリエル線図である。

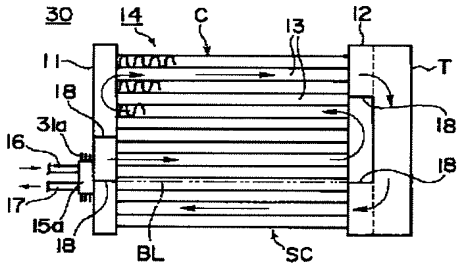
【符号の説明】

１１，１２…ヘッダパイプ、　１３…扁平管、１４…コア部、　１５…配管継手、１５ａ…本体ブロック、　１６…配管（入口管）、１７…配管（出口管）、　１８…仕切板、３０…熱交換器、　３１…放熱部材、３１ａ…放熱フィン、　Ｃ…凝縮部、ｆ…伝熱フィン、　Ｓ…スリット、ＳＣ…過冷却部、　Ｔ…タンク部。

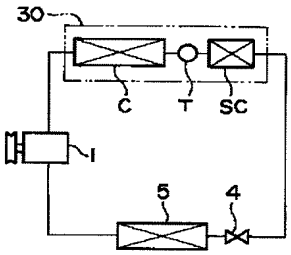
【図１】



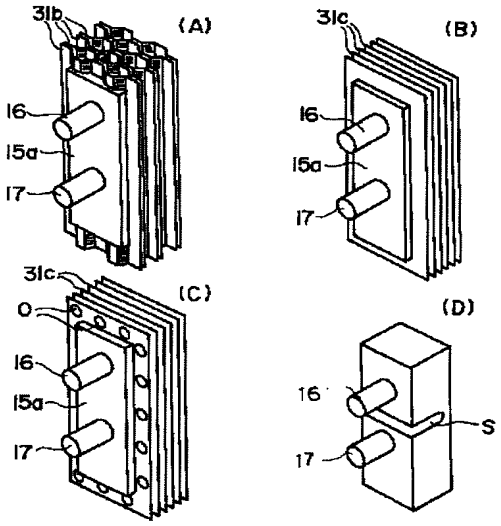
【図２】



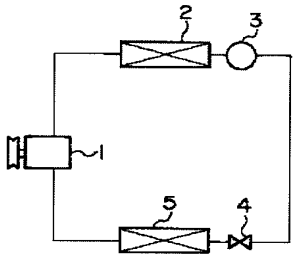
【図３】



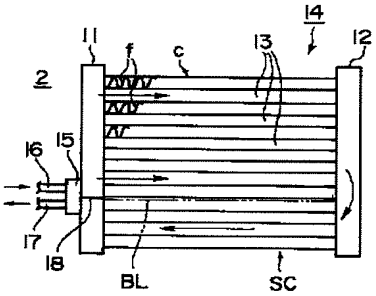
【図４】



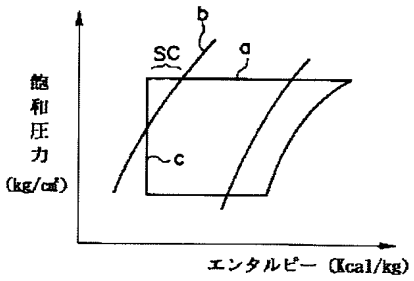
【図５】



【図６】



【図７】



* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The piping joint with a cooling function characterized by preparing radiator material (31) in the body block (15a) with which piping (17) for which the fluid of piping (16) for which a hot fluid circulates, a moderate temperature, or low temperature circulates was connected.
[Claim 2] Said body block (15a) is the header pipe (11 12) of a heat exchanger (30). Piping joint with a cooling function according to claim 1 characterized by what was attached by low attachment.
[Claim 3] Said radiator material (31) is the radiation fin (31a) projected in [block / (15a) / said / body] one so that the heat of said high-temperature fluid might be emitted outside. Piping joint with a cooling function according to claim 1 or 2 characterized by constituting.
[Claim 4] Said radiator material (31) is a piping joint with a cooling function according to claim 1 or 2 characterized by forming a slit (S) between said inlet pipes (16) and outlet pipes (17) of said body block (15a) so that the heat of said high-temperature fluid may not be transmitted to the fluid side of inside low temperature.
[Claim 5] Said heat exchanger (30) is the header pipe (11 12) of a pair. It opens mutual for free passage with much flat tubing (13). It is a heat transfer fin (f) between each flat tubing (13). It has the infixed core section (14). Said header pipe (11 12) It is the capacitor of the multi-pass type multi-flow type constituted so that it might flow down the refrigerant which flowed from the inlet pipe (16) by forming a dashboard (18) inside moving the inside of said core section (14) in a zigzag direction. It has the condensation section (C) which condenses the refrigerant which flowed from said inlet pipe (16), and the subcooling zone (SC) which cools the condensed refrigerant concerned further. The piping joint with a cooling function according to claim 2 characterized by having approached said body block (15a) in juxtaposition, and connecting with it said outlet pipe (17) which flows out the refrigerant supercooled by the subcooling zone (SC) concerned, and said inlet pipe (16).
[Claim 6] Said heat exchanger (30) is said header pipe (11 12). The tank section in which said refrigerant liquefied to either or both is stored (T) It prepares and is the tank section (T) concerned. Piping joint with a cooling function according to claim 5 characterized by making it inner liquid cooling intermediation flow out through an outlet pipe (17) from said subcooling zone (SC).

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates the interior to the piping joint for connecting refrigerant piping of for example, the conditioner for automobiles, and the piping joint with a cooling function which may radiate heat in the heat of flowing fluid especially.
[0002]
[Description of the Prior Art] the capacitor incorporated here to the latest conditioner for automobiles since the request that the heat exchange engine performance is space-saving highly is strong -- high-performance-izing -- it is miniaturized.
[0003] In the general well-known air conditioning cycle, as shown in drawing 5 , the evaporation refrigerant of elevated-temperature high pressure breathed out from the compressor 1 is condensed by the capacitor 2, a part is stored by the liquid tank 3, the remainder is led to an evaporator 5 through the expansion valve 4, and it has [this liquid cooling intermediation performs air and heat exchange here, and] the composition of blowing off for example, to the vehicle interior of a room, in the cooled air.
[0004] By building the liquid tank 3 into a capacitor 2, the latest air conditioning system for automobiles attains the miniaturization of the whole equipment, and uses this capacitor itself as the so-called multi-pass type multi-flow type of capacitor, and is attaining high performance-ization.
[0005] Here in the multi-pass type multi-flow type capacitor 2 So that it may be open for free passage with the header pipes 11 and 12 of the pair opposite-**(ed) in parallel, as shown in drawing 6 Form much flat tubing 13, and fix the heat transfer fin f between these flat tubing 13, and the core section 14 is formed in it. So that an inlet pipe 16 and an outlet pipe 17 may be connected to the piping joint 15 attached in one header pipe 11, the refrigerant which flowed from this inlet pipe 16 may move in a zigzag direction and flow the core section 14 and it may flow out from an outlet pipe 17 The dashboard 18 is formed in said header pipe 11 and 12.
[0006] That is, many paths (pass is called below) for which the refrigerant style to which this capacitor 2 flows the inside of the flat tubing 13 of one group flows toward the header pipe 12 of another side from one header pipe 11 were formed. Since it is the multi-pass type which this is made to move in a zigzag direction within a core 14, and passes it while a lot of refrigerants are put in block with two or more flat tubing 13 and pouring them by the so-called multi-flow type of a multi-pass type Even if small, the heat exchange engine performance is high and it is highly efficient, and it has become the small thing which moreover also has the function of a liquid tank.

[0007]
[Problem(s) to be Solved by the Invention] However, by this capacitor 2, heat transfer happens in the interface BL (the two-dot chain line in drawing shows) with the condensation section C in which the subcooling zone SC and the hot gas refrigerant of the lower part in which liquid cooling intermediation of the supercooled moderate temperature flows flow, the refrigerant cooled by the subcooling zone SC is reheated, and there is a possibility that it may become impossible to take a subperiod of treatment (supercooling). For example, if the amount of refrigerant enclosure is

near proper, or it is only liquefying a refrigerant in the outlet part of a capacitor 2, and a subperiod of treatment cannot be taken enough but heat transfer happens further here in being a little few, a refrigerant will be in the unstable condition of saying that it gasifies. In addition, a "subperiod of treatment" means the part SC until the condensation line a exceeds a saturation curve b and intersects the adiabatic-expansion line c in the Mollier chart of drawing 7 .

[0008] When it will be in such an unstable condition, it will be in the so-called hunting condition which repeats a liquid condition and a gas condition by turns, the cooling engine performance of an evaporator 5 also becomes low, and the refrigerant which flows into the expansion valve 4 has a possibility of also changing the temperature of the air which blows off to the vehicle interior of a room.

[0009] Especially, recently, although there is a request called small-amount-izing of the amount of use refrigerants from a viewpoint of earth environmental protection for this reason, when a little refrigerant is poured using the high performance capacitor 2 mentioned above when the amount of use refrigerants was reduced, also to fluctuation of few thermal loads, the refrigerant condition in a capacitor 2 will be changed and said fault will be promoted further.

[0010] This invention was made in view of such a technical problem, and aims at offering the piping joint with a cooling function with which it was made for the heat from piping with which a hot fluid flows not to have a thermal effect on the fluid of inside low temperature.

[0011]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention concerning claim 1 is characterized by preparing radiator material in the body block with which piping for which the fluid of piping for which a hot fluid circulates, a moderate temperature, or low temperature circulates was connected.

[0012] Thus, if it is made like, since the heat of piping with which a high-temperature fluid circulates will radiate heat outside by the radiator material of a body block, it cannot have a thermal effect on the fluid of inside low temperature, but the fluid by the side of inside low temperature can be poured in the state of a desired fluid. Since especially a piping joint is formed in the entrance part of piping, even if it carries out contiguity arrangement of both the piping, it can prevent the thermal effect between both fluids, and, thereby, becomes in tooth space and advantageous.

[0013] Invention concerning claim 2 is characterized by attaching said body block in the header pipe of a heat exchanger by low attachment.

[0014] If it does in this way, it becomes easy to incorporate the heat in the case of carrying out low attachment junction of the body block inside a body block by radiator material to the header pipe of a heat exchanger, and a body block will carry out a temperature rise promptly, will raise low attachment nature, and productivity's will improve.

[0015] Invention concerning claim 3 is characterized by constituting said radiator material with the radiation fin projected in [block / said / body] one so that the heat of said high-temperature fluid might be emitted outside.

[0016] If it does in this way, it will become what excelled [pipe / of a heat exchanger / header] also in the heat dissipation engine performance from a body block at the time of the heat-exchanger use concerned in addition to improvement in the low attachment nature in the case of carrying out low attachment junction of the body block, and productivity.

[0017] Invention concerning claim 4 is characterized by forming a slit between said inlet pipes and outlet pipes of said body block so that said radiator material may not be transmitted to the heat of said high-temperature fluid at the fluid side of inside low temperature.

[0018] If it does in this way, the heat by the side of a high-temperature fluid can be prevented from making a body block influence the header pipe of a heat exchanger at an inside cryogenic fluid side in addition to improvement in the low attachment nature in the case of carrying out low attachment junction, and productivity. Moreover, thereby, shaping of radiator material also becomes easy.

[0019] Said heat exchanger which is the partner by whom said body block is attached invention concerning claim 5 Open both the header pipes of a pair for free passage with much flat tubing, and it has the core section which the heat transfer fin infixed between each flat tubing. It is the

capacitor of the multi-pass type multi-flow type constituted so that it might flow down the refrigerant which flowed from the inlet pipe by forming a dashboard in said header pipe moving said core circles in a zigzag direction. It has the condensation section which condenses the refrigerant which flowed from said inlet pipe, and the subcooling zone which cools the condensed refrigerant concerned further, and is characterized by having approached said body block in juxtaposition and connecting with it said outlet pipe which flows out the refrigerant supercooled by the subcooling zone concerned, and said inlet pipe.

[0020] If it does in this way, when a hot gas refrigerant will flow, the 1st order of the elevated-temperature refrigerant concerned can be cooled, and the condensation engine performance of a capacitor can be raised more. Moreover, even if heat transfer breaks out between the subcooling zone to which liquid cooling intermediation of the moderate temperature supercooled by the capacitor flows, and the condensation section in which a hot gas refrigerant flows, the temperature and the pressure of a refrigerant rise and a subperiod of treatment decreases Since a refrigerant is again supercooled in an outlet part, the fall of a subperiod of treatment can be prevented, it can prevent that becomes unstable so that a refrigerant may gasify and the condition of being an air conditioning cycle may carry out hunting, and fluctuation of the cooling degradation of an evaporator and the blow-off air temperature to the vehicle interior of a room can also be prevented.

[0021] Invention concerning claim 6 has the tank section in which said refrigerant which said heat exchanger which is the partner by whom said body block is attached liquefied to both said header both [either or] is stored, and is characterized by making it liquid cooling intermediation of the tank circles concerned flow out through an outlet pipe from said subcooling zone.

[0022] If it does in this way, it compares, when forming a liquid tank separately, it becomes advantageous in tooth space, and this can be absorbed also in the time of superfluous refrigerant enclosure, the always stabilized refrigerant can be led to an evaporator, and the degradation of an evaporator etc. can be prevented.

[0023]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained based on a drawing. The outline perspective view showing the condition that drawing 1 attached the piping joint with a cooling function concerning the gestalt of operation of this invention in a part for the header pipe of a multi-pass type multi-flow type capacitor, Drawing 2 is the perspective view of the piping joint with a cooling function which the outline sectional view of this capacitor and drawing 3 require for the conceptual diagram of this capacitor, and drawing 4 requires for the gestalt of other operations of this invention, may use the same sign for the same member as the member shown in drawing 5 -7 in the following explanation, and may omit a part of explanation.

[0024] It is the capacitor of small high performance, and the capacitor 30 shown in drawing 1 is the so-called multi-flow type of a multi-pass type, it opens for free passage the header pipe 11 of a pair which consists of aluminum or an aluminium alloy (an aluminium alloy etc. is called below), and both 12 with much flat tubing 13 which consists of this aluminium alloy etc., and has the core section 14 in which the heat transfer fin f which consists of this aluminium alloy plate etc. between each flat tubing 13 was infixed.

[0025] As this core section 14 is shown in drawing 2 , a dashboard 18 is formed in the header pipe 11 and 12. The refrigerant which flowed into the header pipe 11 enters in the header pipe 12 through the inside of two or more flat tubing 13 from an inlet pipe 16. After making a U-turn, it has return, the condensation section C constituted so that a U-turn might be made again and it might enter in the header pipe 12, and the tank section T by which a part of condensed liquid cooling intermediation is stored and the subcooling zone SC by which liquid cooling intermediation is cooled further to the header pipe 11. That is, if this capacitor 30 is shown notionally, it is in the condition that the condensation section C, the tank section T, and a subcooling zone SC were formed in the serial, as [show / in drawing 3].

[0026] And the outlet pipe 17 into which the refrigerant supercooled by this subcooling zone SC flows, and said inlet pipe 16 approach in juxtaposition the piping joint 15 which fixed by low attachment, and are connected with said header pipe 11. This piping joint 15 established the

through-hole to body block 15a which consists of an aluminium alloy etc., inserted the edge of said inlet pipe 16 and outlet pipe 17 in this through-hole, and has fixed by low attachment.
[0027] Especially, with the gestalt of this operation, the radiator material 31 which emits the heat of the high-temperature fluid by the side of an inlet pipe 16 outside is formed in body block 15a with which the inlet pipe 16 with which a hot fluid circulates in this way, and the outlet pipe 17 to which the fluid of a moderate temperature or low temperature circulates were connected.
[0028] Although the radiator material 31 shown in drawing 1 is constituted by wave-like radiation-fin 31a formed so that it might project in [a / which consists of an aluminium alloy etc. / body block 15] one As long as it has the heat dissipation function which emits promptly outside the heat transmitted to body block 15a from the inlet pipe 16, you may be what kind of thing. For example, the thing which carried out louvering of the louver to parallel plate fin 31b by which irregularity was repeated as shown in drawing 4 A, What was formed by fixing light-gage plate 31c to the perimeter of body block 15a as shown in drawing 4 B, What established Through-hole O to the light-gage plate 31c concerned, and was lightweight-ized to it as shown in drawing 4 C, the thing in which the slit S which prevents heat transfer was formed between the inlet pipes 16 and outlet pipes 17 which were connected with body block 15a as shown in drawing 4 D, etc. are used suitably. In addition, parallel plate fin 31b and light-gage plate 31c by which said irregularity was repeated by body block 15a in which this slit S was formed may be attached. Moreover, the so-called corrugated fin (not shown) which formed the light-gage plate in body block 15a mentioned above in the shape of a wave may be fixed.
[0029] Moreover, the tank section T in which the refrigerant liquefied to the header pipe 12 is stored is formed in said capacitor 30. If it does in this way, it compares, when forming a liquid tank separately, it becomes advantageous in tooth space, and this can be absorbed also in the time of superfluous refrigerant enclosure, the always stabilized refrigerant can be led to an evaporator 5, and the degradation of an evaporator 5 etc. can be prevented. In addition, the header pipe 11 or any of 12 is sufficient as the header pipe with which the tank section T is attached, and it may be prepared in both.
[0030] Next, an operation of the gestalt of the above-mentioned implementation is explained. First, in manufacturing a capacitor 30, it fabricates the whole to one by low attachment in a furnace. That is, much flat tubing 13 is formed between both the header pipe 11 and 12, and the heat transfer fin f is infixed between each flat tubing 13, further, where it attached body block 15a and the entrance tubing 16 and 17 in the header pipe 11 and the tank section T is attached in the header pipe 12 of another side, it puts in in a furnace and heats, and low attachment of the whole is carried out in one.
[0031] In this case, since heat also joins body block 15a and block 15 has large heat capacity compared with the header pipes 11 and 12, the flat tubing 13, and Fin f, Although a temperature rise becomes late and temperature distributions tend to differ, to this body block 15a Since the radiator material 31 is formed, the heat from the outside is transmitted to the interior through this radiator material 31, promotes the temperature rise of body block 15a, and becomes the same as the temperature rise of other parts, low attachment nature is improved, and productivity also improves.
[0032] And if the usual air conditioning operation is performed using the capacitor 30 fabricated by doing in this way, the evaporation refrigerant of elevated-temperature high pressure breathed out from the compressor 1 goes into the header pipe 11 from the inlet pipe 16 of a capacitor 30, will flow down the inside of two or more flat tubing 13 which constitutes the condensation section C, it flowing and being condensed here, and will turn into liquid cooling intermediation. In this case, since the 1st order of the elevated-temperature refrigerant concerned will be cooled by the radiator material 31 of body block 15a when a hot gas refrigerant flows, the condensation engine performance of a capacitor 30 is raised more.
[0033] After the part has been stored by the tank section T, this liquid cooling intermediation carries out heat exchange to external cooling air, when circulating the subcooling zone SC of the lower region of a capacitor 30, and it is cooled further, and a subperiod of treatment is taken. In the case of the usual air conditioning system for automobiles, a subperiod of treatment is about 5 - 8 times. The liquid cooling intermediation by which the subperiod of treatment was taken is

led to an expansion valve 4 from the return outlet pipe 17 in the header pipe 11.
[0034] However, the refrigerant which circulates the inside of an inlet pipe 16 is an elevated temperature, while, as for the refrigerant which flows out from an outlet pipe 17, the subperiod of treatment was taken, since it is a low-temperature refrigerant, the heat of the elevated-temperature refrigerant of an inlet pipe 16 will be transmitted to the refrigerant of the inside low temperature of an outlet pipe 17 through body block 15a, the temperature and the pressure of a refrigerant will rise, and a subperiod of treatment will decrease.
[0035] However, since body block 15a will be cooled by the airstream which is flowing the exterior since the radiator material 31 is formed in this body block 15a and a refrigerant will be again supercooled in an outlet part, as for a refrigerant, the fall of a subperiod of treatment is prevented.
[0036] For example, although the amount of refrigerant enclosure is near proper, or it liquefies a refrigerant in an outlet part by the usual capacitor 30 in being a little few Although a subperiod of treatment may be unable to be taken enough Even in such a case, the capacitor 30 of the gestalt of this operation is body block 15a of a refrigerant outlet, and since it will cool a refrigerant further, it can prevent that a refrigerant gasifies again here, this flows to a down-stream expansion valve and an evaporator, and an air conditioning cycle will be in an unstable condition.
[0037] then, if the amount of circulation refrigerants also increases with the rise of the engine speed of a compressor, the amount of the liquid cooling intermediation produced in a capacitor 30 will also increase, and liquid cooling intermediation will store in the tank section T -- having -- a subcool amount -- the engine speed of a compressor -- irrespective of how, it becomes fixed and the liquid cooling intermediation by which the predetermined subperiod of treatment was taken is stably supplied by the expansion valve 4.
[0038] Therefore, even if an outlet pipe 17 receives the pressure loss of heat-receiving or some, a refrigerant will not be in a hunting condition, but its cooling engine performance of an evaporator 5 also improves, and it will be in a desirable condition also from the stability of a cycle, and the field of cooling power reservation.
[0039] This invention is not limited only to the gestalt of operation mentioned above, and can be variously changed within the limits of an application for patent. For example, although the gestalt of said operation explained the capacitor 30, this invention is not limited only to a capacitor, and if attached in the heat exchanger with which piping for which a high-temperature fluid and inside cryogenic fluid flow is connected, what kind of thing is sufficient as it, and it can be used for an evaporator etc.
[0040]
[Effect of the Invention] As stated above, since the heat of piping with which a high-temperature fluid circulates radiates heat outside by the radiator material of a body block, invention according to claim 1 cannot have a thermal effect on the fluid of inside low temperature, but can pour the fluid by the side of inside low temperature in the state of a desired fluid. Since it is prepared in the entrance part of piping, even if especially a piping joint carries out contiguity arrangement of both the piping, it can prevent the thermal effect between both fluids. Moreover, this becomes in tooth space and advantageous.
[0041] Endoergic [of the heat in the case of carrying out low attachment junction of the body block] is carried out to the header pipe of a heat exchanger so much from radiator material, since a block carries out a temperature rise immediately and becomes low attachment temperature, invention concerning claim 2 raises low attachment nature, and its productivity also improves.
[0042] Since the radiation fin which projected radiator material in [block / body] one constituted invention concerning claim 3, it becomes what excelled [pipe / of a heat exchanger / header] also in the heat dissipation engine performance from a body block at the time of the heat-exchanger use concerned in addition to improvement in the low attachment nature in the case of carrying out low attachment junction of the body block, and productivity.
[0043] In addition to improvement in low attachment nature in case invention concerning claim 4 carries out low attachment junction of the body block at the header pipe of a heat exchanger,

and productivity, the heat of a high-temperature fluid does not influence at inside cryogenic fluid, and shaping of radiator material also becomes easy.

[0044] Since invention concerning claim 5 was made to carry out low attachment fixing of the body block which has entrance tubing connected with the header pipe of a multi-pass type multi-flow type capacitor by approaching in juxtaposition The subcooling zone to which liquid cooling intermediation of the moderate temperature which could cool the 1st order of the elevated-temperature refrigerant concerned, and could raise the condensation engine performance of a capacitor more, and was supercooled by the capacitor when a hot gas refrigerant flowed flows, Since a refrigerant is again supercooled in an outlet part even if heat transfer breaks out between the condensation sections in which a hot gas refrigerant flows, the temperature and the pressure of a refrigerant rise again and a subperiod of treatment decreases The condition of a refrigerant is restored, can prevent the fall of a subperiod of treatment, can prevent that a refrigerant gasifies again and an air conditioning cycle becomes unstable, and can also prevent fluctuation of the blow-off air temperature to the cooling degradation of an evaporator, the vehicle interior of a room, etc.

[0045] Since invention concerning claim 6 prepared the tank section in the header pipe, when preparing the liquid tank section separately, it is compared, it becomes advantageous in tooth space, and can absorb this also in the time of superfluous refrigerant enclosure, can lead the always stabilized refrigerant to an evaporator, and can prevent the degradation of an evaporator etc.

[Translation done.]

* NOTICES *

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the outline perspective view showing the gestalt of operation of this invention.
[Drawing 2] It is the outline sectional view of the gestalt of this operation.
[Drawing 3] It is the conceptual diagram of the gestalt of this operation.
[Drawing 4] It is the perspective view showing the gestalt of other operations of this invention.
[Drawing 5] It is the explanatory view showing a general air conditioning cycle.
[Drawing 6] It is the sectional view of the conventional capacitor.
[Drawing 7] It is a common Mollier chart.
[Description of Notations]
11 12 -- Header pipe, 13 -- Flat tubing, 14 -- Core section, 15 -- A piping joint, 15a -- Body block, 16 -- Piping (inlet pipe), 17 -- Piping (outlet pipe), 18 -- A dashboard, 30 -- Heat exchanger, 31 -- Radiator material, 31a -- Radiation fin C [S / T -- Tank section. / -- A slit, SC -- Subcooling zone] -- The condensation section, f -- Heat transfer fin

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[Translation done.]